



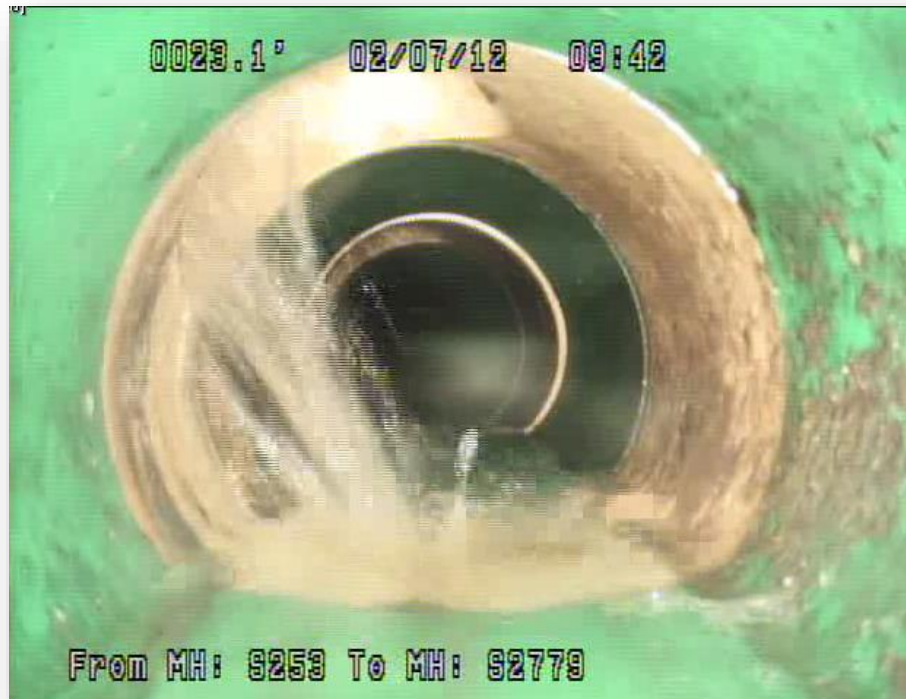
Lateral Inspection, Evaluation & Design

Jonathan Kunay, P.E.



Service Laterals and Their Connections to the Mainline

- Can Contribute up to $\frac{1}{2}$ of System Infiltration



Service Lateral Liners

- **Proven Technology**
- **New Technologies and Methods of Installation**
- **Documented Successes**
- **Important Tool in Your Rehabilitation Product Arsenal**
- **Critical for Comprehensive Rehabilitation Programs**



Purpose of Service Lateral Liners

- Seal Annular Space and Connection between Service Lateral and CIPP Lined Mainline Sewer
- Rehabilitate Service Lateral Pipe to Various Lengths
- Increases life of Critical Component of the Collection System





Comprehensive Sewer System Rehabilitation

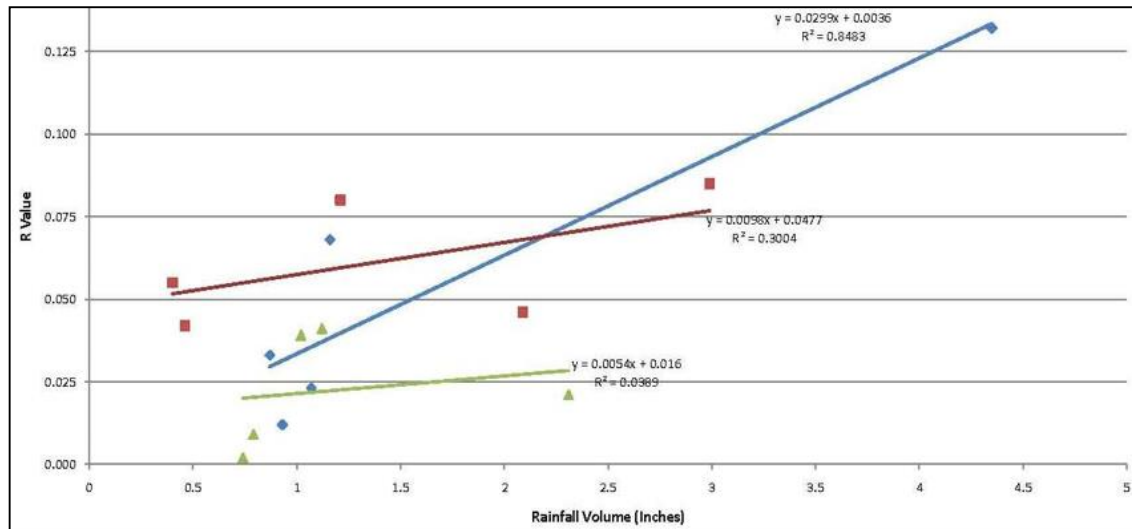
- Cured-in-Place Pipe Lining
- Service Lateral Lining to Various Lengths
- Manhole Rehabilitation
- Private Inflow Removal





Comprehensive Sewer System Rehabilitation

- Proven to Remove High Percentages of I/I
 - 50% - 75%
- Successfully Implemented in Various Municipalities Across the Country
- Most Successful in Smaller Sub-Areas 10,000 – 20,000 Linear Feet



The Need for a Comprehensive Approach

- Administrative Consent Order/Consent Decree
- Violations of the Clean Water Act
- Widespread Defects
- 100+ Year Old Sewers
- Poorly Maintained
- Shotgun Approach has Failed in the Past
- Provides the Most “Bang for the Buck”



Key Component in Comprehensive Rehabilitation Programs

- Service Lateral Connection and Full Length Service Lateral Lining



Lateral Inspection – Pan & Tilt

- Mainline Sewer CCTV Camera with Pan & Tilt
- Inspection Performed from Mainline Sewer
- No Cleanout/Access Point Needed
- Can Typically Only See up a Few Feet





Lateral Inspection – Push Camera

- Insert Camera through Cleanout or other Access Point, if available



Lateral Inspection – Lateral Launch Camera

- Launch Camera from the Mainline Sewer
- No Cleanout/Access Point Needed
- Can Traverse 80+ feet



Lateral Cleaning

- Lateral Cleaning Techniques have Improved
 - Up to 80+ Feet from Main Line Sewer
- Done With or Without a Cleanout/Access Point

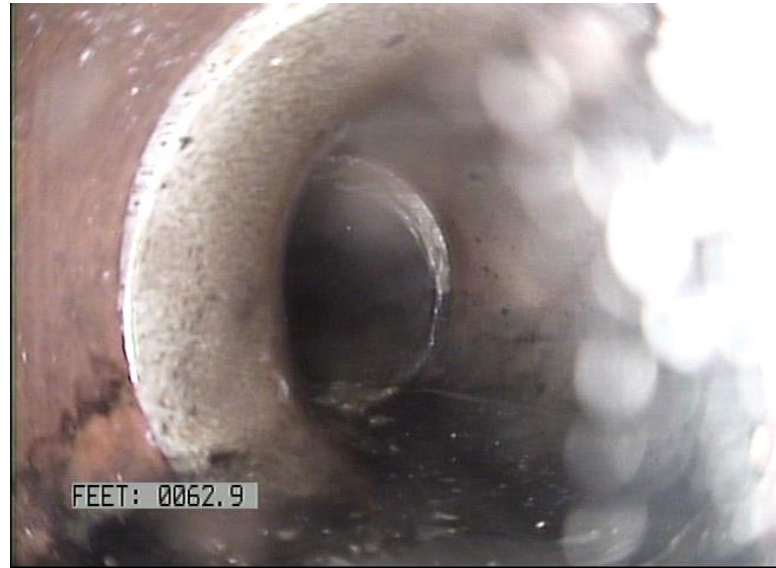


Lateral Cleaning

Pre-cleaning



Post-cleaning





Lateral Rehabilitation Evaluation

- **Review CCTV Inspection Videos**
- **Determine Extents of Defects and Deterioration**
 - **Mainline Sewer**
 - **Service Laterals**
- **Identify Location and Extents of Spot Repairs**
- **Determine Service Sizes, Material, Depth, Number of Service Connections (open/capped)**
- **Match Rehabilitation Recommendations with Goals of Program**
 - **Line or Grout Laterals**
 - **Lateral Connection Lining vs. Full Length Lateral Lining**





Factors to Consider During Design:

- **Design Life/Service Life**
- **Goals of Rehabilitation Program**
- **Liner Type/Style**
- **Distance Up Lateral Required for Rehabilitation**





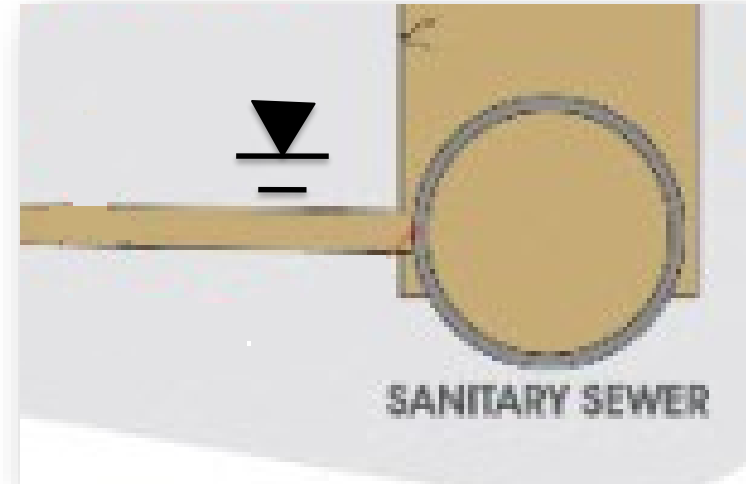
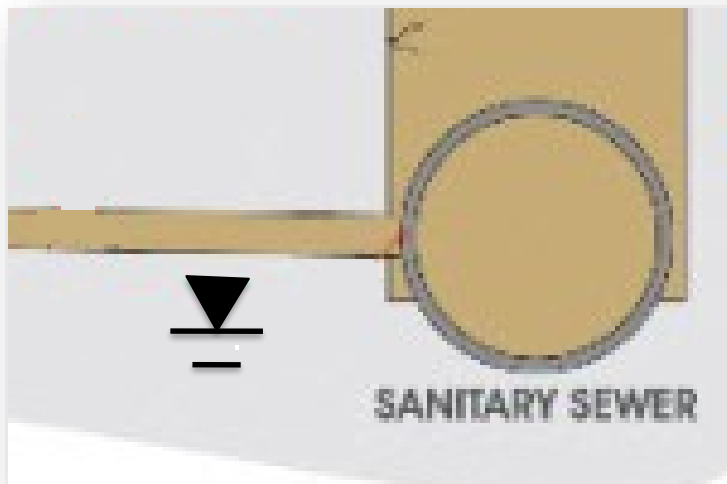
Factors to Consider During Design:

- **Design Life**
 - **Based on Calculations Related to Strength Characteristics of Design**
- **Service Life**
 - **Actual Amount of Time Until Weakest Component of a Particular Product Fails**



Design Life/Service Life of Chemical Grout

- Design Life of 5 – 20 Years Based on Site Specific Characteristics
 - Connection Fully Submerged at all Times
 - Varying Groundwater Table



Recommending Chemical Grout Only

- Connection is Fully Submerged at all Times
- Evaluate Goals of Rehabilitation Program
 - Aggressive Approach for Removing Infiltration from Lateral Connections Not Needed



Recommending Service Lateral Liners

- Varying Groundwater Conditions
- Integrity of Service Laterals is Severely Degraded
- Long-Term Comprehensive Rehabilitation Program
 - High Percentages of Infiltration Must be Removed



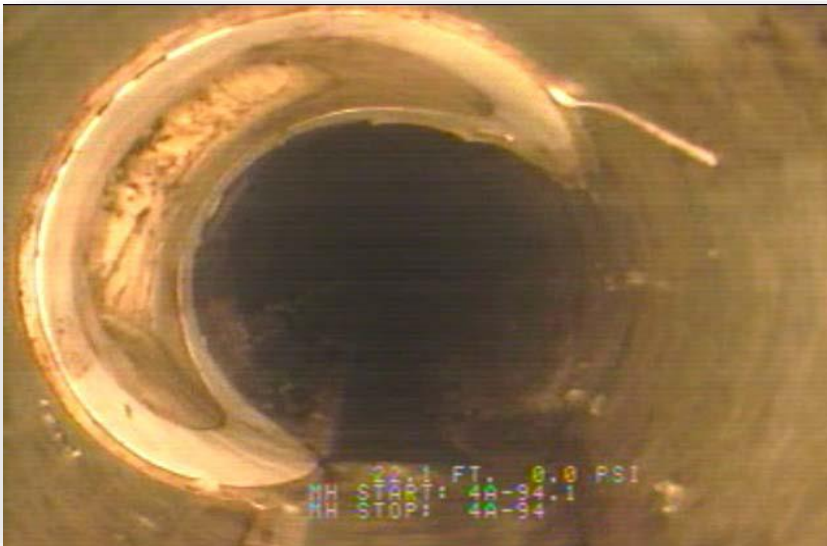
Design for Service Lateral Lining

- **Service Lateral Liner Options:**
 - **Connection in the Mainline Sewer**
 - **Length of Liner Up Into Service Lateral**
 - **Installation Method**



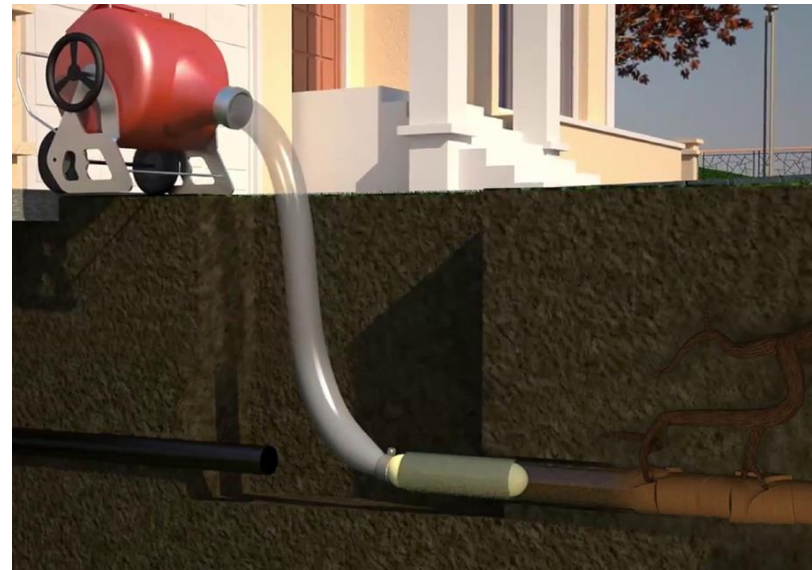
Lateral Connection Lining

- Rehabilitates Service Lateral Connection to Mainline Sewer
- Extends 24" – 36" into Service Lateral
- Installation Performed from the Mainline Sewer
- Does Not Require Cleanout/Other Access Point
- Brim-Style or Full-Wrap in the Main



Full-Length Lateral Lining

- Installed From Mainline Sewer or Cleanout/Other Access Point
- Extends Various Lengths and up to 4" Cast Iron from Property
- Can Seal Connection to the Mainline – Installed from Mainline
- Some Products Require a Cleanout/Other Access Point





Connection Liner or Full-Length Liner: Deciding Which to Recommend

- **Distance Up Lateral Needed for Rehabilitation**
- **Goals of the Program**
 - **Consent Order Driven**
 - **Structural Issues**
 - **Infiltration Issues**
- **Do Cleanout Exist?**
 - **Some Products Require Cleanouts for Installation**
 - **Work on Private Property**
- **Ownership**
- **Available Funding**
- **Location of Groundwater Table**
 - **Can Help Determine How Far Up the Lateral to Line**



Conclusions

- Rehabilitating Only Mainline Pipe Addresses Only a Fraction of Infiltration
- Service Lateral Liner Recommendations Include Many Variables
- A Detailed Evaluation of the Collection System is Required
- New Technologies/Advances Should Constantly be Evaluated





Questions?

- For More Information:
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Thank You!